

## **SMITHISTRUMA MEMORIALIS (HYMENOPTERA: FORMICIDAE), A NEW SPECIES OF ANT FROM THE KENTUCKY CUMBERLAND PLATEAU<sup>1</sup>**

Mark Deyrup<sup>2</sup>

**ABSTRACT:** A new species of dacetine ant, *Smithistruma memorialis*, is described. It was found on top of a ridge on the Cumberland Plateau in Kentucky. This species is distinguished from other North American species of *Smithistruma* by its short, erect, unmodified hairs on the occiput, body and legs. It appears to be a member of the *pulchella* group of *Smithistruma*. It is named in honor of the late William L. Brown, Jr., who greatly advanced our knowledge of dacetine ants.

The genus *Smithistruma* was described in 1948 by a pioneer of ant systematics, the late William L. Brown, Jr., and his revision of the Nearctic species (1953) was so competent that it still serves well, almost 45 years after its publication. The species described below is dedicated to Dr. Brown, in gratitude for his original work in bringing order to our knowledge of dacetine ants, and making the systematics and biology of these ants accessible to other naturalists. This was only one of Dr. Brown's many contributions to myrmecology, biogeography, and evolutionary biology.

*Smithistruma* includes about 104 described species (Bolton 1995). There are probably additional species to be discovered, as these ants are small (workers about 2 mm long), slow-moving, and usually hidden in leaf litter, rotten wood, or soil. Even in the eastern United States, where the cryptic ant fauna is relatively well known, there are a number of species that are rare in collections, and it is still possible to find undescribed species.

### *Smithistruma memorialis* Deyrup, NEW SPECIES

**Diagnosis.** Distinguished from all other Nearctic *Smithistruma* by the presence of abundant, erect, unmodified hairs on the occiput, body and legs, and the lack of reclinate widened hairs in these areas (Fig. 1). The clypeus is similar to that of *S. missouriensis* (M. R. Smith) in shape and arrangement of enlarged hairs.

**Description.** Holotype worker. Measurements in mm: Total length: 1.98; head length: 0.51; maximum head width: 0.40; length of alitrunk: 0.46.

Features described below as in Fig. 1. Head with preocular laminae not continuing the outline of the occipital lobes, so outline of head in frontal view not cuneiform. Mandible in lateral view not tapering, but abruptly decurved at tip; mandibular diastema conspicuous at full closure;

<sup>1</sup> Received June 25, 1997. Accepted August 1, 1997.

<sup>2</sup> Archbold Biological Station, P. O. Box 2057, Lake Placid, FL 33862

mandibles with four principle teeth in the subapical series, the second largest, the first next largest, the fourth next largest, the third smallest. Clypeus with the apex rounded and thickened, central area of clypeus minutely reticulate, completely bare, slightly raised and diamond shaped; each side of clypeus with three small spoon-shaped hairs on the edge of the basal external corner, two large, spoon-shaped, anteriorly directed hairs on the anterior margin, at points about one-fifth and one half the distance to the apex, a large, spoon-shaped, posteriorly directed submedian hair, and two small, submarginal, submedian spoon-shaped hairs. Antennal scapes with enlarged, erect, untapered hairs on the inner margin as follows: one subbasal, directed slightly toward the apex of the scape, a series of four or five in descending size, more or less evenly spaced, directed slightly toward the base of the scape. Frontal area with small, sparse, inconspicuous, medially directed, reclinate spoon-shaped hairs. Occiput with sparse, erect, straight, blunt hairs, no especially elongate or widened hairs on the lateral margins of the occiput. Upper part of head finely reticulate as in other members of the *pulchella* group, with inconspicuous, sparse, longitudinal rugae.

Pronotum finely reticulate dorsally, sparsely and evenly covered with erect hairs, no elongate or otherwise distinctive hairs in the humeral area, smooth and shining laterally, convex in profile. Remainder of alitrunk with dorsum finely reticulate, with a few erect hairs, lateral areas smooth and shining. Propodeal teeth short, broad, infradental carinae narrow, evenly concave. Legs, including tarsi, with sparse, suberect hairs, without reclinate enlarged or spatulate hairs, no outstanding elongate curved or crimped hairs on the apical third of the mid or hind tibiae or basitarsi.

Petiole finely reticulate dorsally, with sparse suberect hairs, infrapetiolear lamina narrow, without a basal lobe or extension, spongiform process small, in lateral view not extending to lower margin of petiole. Postpetiole with dorsal suberect hairs, lower spongiform process small, not extending down past upper half of basal face of first sternite of gaster. Gaster with sparse, short erect hairs on dorsal surface, long dorsal hairs absent.

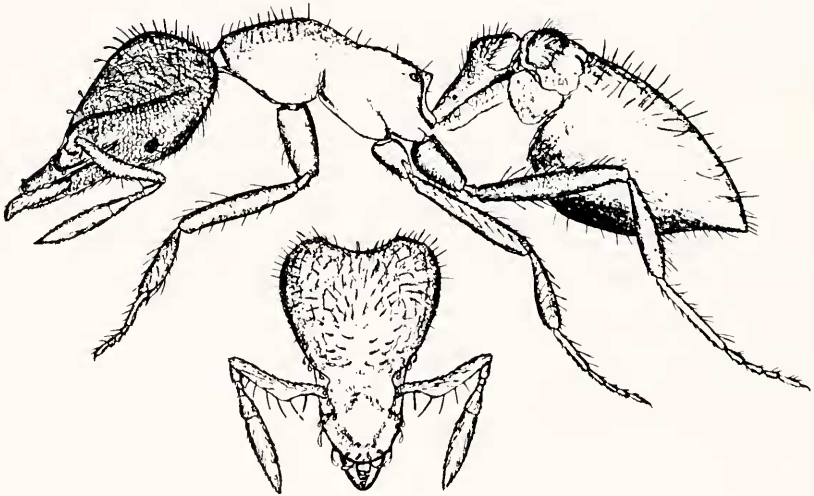


Figure 1. *Smithistruma memorialis*, new species

**Paratype female.** Measurements in mm: Total length: 2.45, head length: 0.68, maximum head width: 0.47, length of alitrunk: 0.57.

Usual queen modifications present: ocelli present, compound eyes large, alitrunk modified for flight. Otherwise, queen resembles worker, including abundant short, erect hairs on dorsum of thorax, gaster and legs. This vestiture distinguishes this specimen from queens of other dacetine species.

**Paratypes.** Paratype material is 61 workers and one queen.

**Collecting data for type material.** All type material shares the same data: KENTUCKY: Laurel Co., Daniel Boone National Forest, Bald Rock picnic area; 23 March 1997; collected by Stephen and Mark Deyrup. Habitat open, grassy, with low herbs, scattered large pines. Nest with holotype worker, allotype queen, and 53 workers found (by Stephen) in a small chamber in clay soil a few centimeters below the surface near the base of a large pine, near the restrooms; 8 workers from a small soil sample about three meters away. Other ants with nearby nests were: *Aphaenogaster tennesseensis* (Mayr) (dealate queen), *Brachymyrmex depilis* Emery, *Leptothorax pergandei* Emery, *Mornomorium minimum* (Buckley), *Paratrechina faisonensis* Forel, *Ponera pennsylvanica* Buckley, *Prenolepis imparis* (Say), *Smithistruma pulchella* (Emery) (dealate queen), *Solenopsis carolinensis* (Forel).

**Deposition of type material.** Holotype, allotype, 12 paratypes: Museum of Comparative Zoology, Harvard University, Cambridge, Mass.; 6 paratypes: National Museum of Natural History, Smithsonian Institution, Washington, D.C.; 6 paratypes: The Natural History Museum, London; 6 paratypes: Los Angeles County Museum of Natural History; 6 paratypes: Florida State Collection of Arthropods, Gainesville, Fla.; 3 paratypes, collection of Lloyd Davis, Gainesville, Fla.; 3 paratypes: Collection of Mark DuBois, Washington, Ill.; 3 paratypes, collection of William MacKay, El Paso, Tex.; remaining specimens in the collection of the Archbold Biological Station, Lake Placid, Fla.

**Etymology.** The specific epithet, translated "of remembrance," dedicates this species to Bill Brown in place of the more usual patronym. For some years Bill Brown had held an antipathy toward patronyms. His main objection, as far as I can tell, was that patronyms often honor people who have only the most trivial association with the species bearing their name, and in the worst cases could be assigned to stoke the egos of sponsors or patrons. I do not think these objections would apply in the case of an honoree who had made great and lasting contributions to our knowledge of a genus, especially when the name is applied posthumously. Nevertheless, I am respecting his feelings by avoiding a direct patronym.

## DISCUSSION

Myrmecologists who deal with dacetines in general and with *Smithistruma* in particular place a well-justified faith in the taxonomic value of the elaborations of the clypeus and mandibles as species-specific character states. In the absence of any plausible theories explaining the remarkable diversity of these features, it is easy to develop an illogical feeling that their biological function is also associated with species recognition, like the modified palps and facial



hairs that distinguish certain male dolichopodid flies in their courtship antics. In *S. memorialis* we see a species that might never have been recognized on the basis of its clypeal structure, which is similar to that of the variable species *S. missouriensis* (Fig. 3). This is a useful, if somewhat worrisome reminder that in *Smithistruma* the shape of the clypeus and the pattern of its pilosity could remain constant in a group of related species.

*Smithistruma memorialis* clearly belongs in Brown's *pulchella* group, along with *missouriensis*, *reflexa*, and *cloydi*. *Smithistruma memorialis* (Fig. 1), *reflexa* (Fig. 2), and *missouriensis* have mandibles that in lateral view are broad and abruptly decurved in their apical third, while the mandibles of *pulchella* (Fig. 4) and *cloydi* (Fig. 5) are slender and tapering. *Smithistruma pulchella*

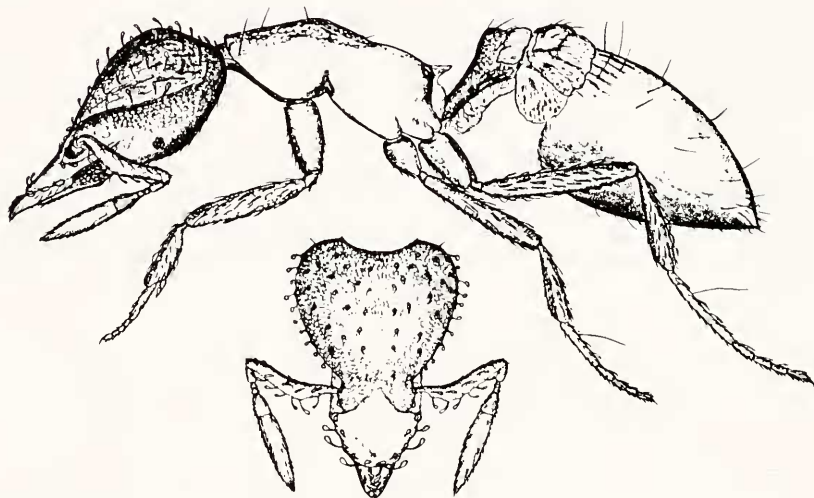


Figure 2. *Smithistruma reflexa* (Wesson and Wesson)

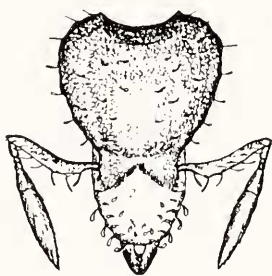


Figure 3. *Smithistruma missouriensis* (Smith)

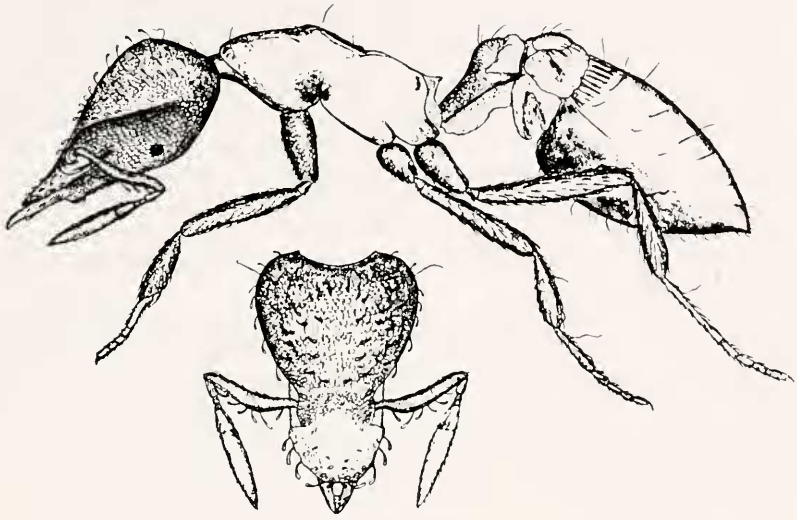


Figure 4. *Smithistruma pulchella* (Emery)

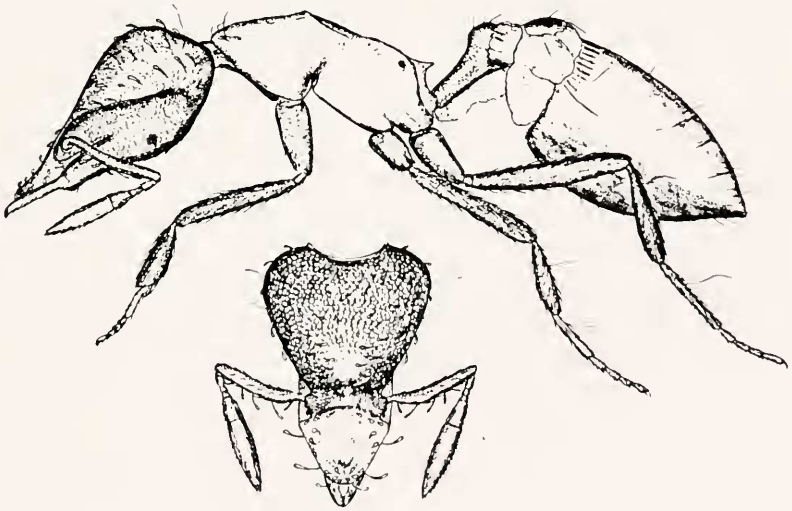


Figure 5. *Smithistruma cloydi* Pfitzer

and *claydi* differ markedly in the shape of the clypeus and in the number and arrangement of clypeal hairs (Figs. 4, 5). *Smithistruma reflexa* and *missouriensis* are distinguished by differences in the orientation of clypeal hairs (Figs. 2, 3), a character that is somewhat variable, and *reflexa* could be a junior synonym of *missouriensis* (Brown 1953); the small series of *missouriensis* that I have studied appears virtually identical to *reflexa* in lateral view. In Brown's 1953 key, *memorialis* keys to *missouriensis* (second half of couplet 23), but is easily distinguished by its bristling hairs. Now that it is clear that species recognition in this complex may depend on more than clypeal hairs, other structural characters should be examined more closely, and we should be cautious in synonymizing species.

The described native species of *Smithistruma* in the southeastern U. S. now number 24, and there are at least two additional undescribed species (Deyrup and Cover, MS in preparation), bringing the known species from the region to 26. Southeastern North America is therefore a major center of diversity for the genus, and Brown (1953) suggested that this fauna is most closely related to that of Asia, rather than to the Neotropical fauna, as had been suggested earlier. Ward (1988) described three species from relict warm mesic areas in the southwestern U.S. This pattern closely matches the distribution of relict concentrations of warm temperate arcto-tertiary flora (Raven and Axelrod 1978). The genus *Smithistruma*, therefore, appears to be our only clear example among the ants of a diverse assemblage left over from the gloriously speciose warm temperate forests of the Miocene. Most of the known species of North American *Smithistruma* are quite widely distributed through the mixed deciduous forests of the Middle Atlantic states, south through north Florida, and west into the more mesic woodlands of eastern Texas. If, however, the genus *Smithistruma* in North America mirrors the distribution of arcto-tertiary flora, there are probably some species confined to isolated habitat types in the southern Appalachians. The species described here, found on top of a ridge on the Cumberland Plateau, could represent such a species.

It seems appropriate to place *memorialis* in Brown's genus *Smithistruma*, even though there are some indications that this genus may disappear in a small implosion of dacetine genera. Unfortunately, Bill Brown will not be around to offer his comments. In a general way, he felt that some changes were necessary: in a recent (2 February, 1997) letter he stated, "...there is no doubt that generic slaughter is overdue." However, he also wrote, in the same letter, "...I hate to see all the names go down, and I'll be watching." As most contemporary myrmecologists know, Bill Brown thought that defining a genus on a strictly phyletic basis could lead to a foolish nomenclature. Paraphyletophobia was not one of his afflictions. In his address at the 1987 meeting of the Entomological Society of America, he publicly expressed the opinion that super-specific names, such as the names of genera, are inevitably derived by an exer-

cise of judgement, and these judgements should be openly informed by ecology and convenience, as well as by phylogenetics. He strongly objected to examples of supposedly objective phyletic nomenclature that were really derived from the secret manipulation of an arcane analysis. I wish I could remember all his much more humorous private comments at this convention. There was one particularly funny comparison of some cladistic taxonomy to astrology, in which all the character states and accomplishments of life are subsidiary to, and mystically influenced by, the exact moment of separation from the mother.

Within the narrow confines of a paper describing one species of dacetine ant, I have tried to touch on the extreme importance of Bill Brown to our understanding of the systematics and biogeography of this group. I would not want to leave the impression that the study of dacetines will falter; for some years the tremendously talented and energetic Barry Bolton of The Natural History Museum, London, has been carrying on the work of large-scale revisions of dacetines. What we have lost is the presence of the man, fantastically knowledgeable, honest, critical, humorous, creative and intuitive, who could inspire both nervousness and relief when he said, "I'll be watching."

#### ACKNOWLEDGMENTS

I am proud to acknowledge our son Stephen as the collector of the large nest series of *Smithistruma memorialis* I also thank the custodians of the Daniel Boone National Forest for watching over the beautiful and diverse habitats of the area, where I am sure that many more undescribed species of interesting insects will be found.

#### LITERATURE CITED

- Bolton, B. 1995. A new general catalog of the ants of the World. Harvard Univ. Press, Cambridge, Mass. 504 pp.
- Brown, W. L., Jr. 1948. A preliminary generic revision of the higher dacetini. Trans. Amer. Entomol. Soc. 74: 101-129.
- Brown, W. L., Jr. 1953. Revisionary studies in the ant tribe Dacetini. Amer. Midl. Natur. 50: 1-137.
- Raven, P. H., and D. I. Axelrod. 1978. Origin and relationships of the California flora. Univ. Cal. Publ. Bot. 72: 1-134.
- Ward, P. S. 1988. Mesic elements in the western Nearctic ant fauna: taxonomic and biological notes on *Amblyopone*, *Proceratium*, and *Smithistruma*. J. Kans. Entomol. Soc. 61: 102-124.